

# Ranger Explorer Activity Guide

National Park Service  
U.S. Department of the Interior  
Shenandoah National Park



## ROCK ON, STONY MAN

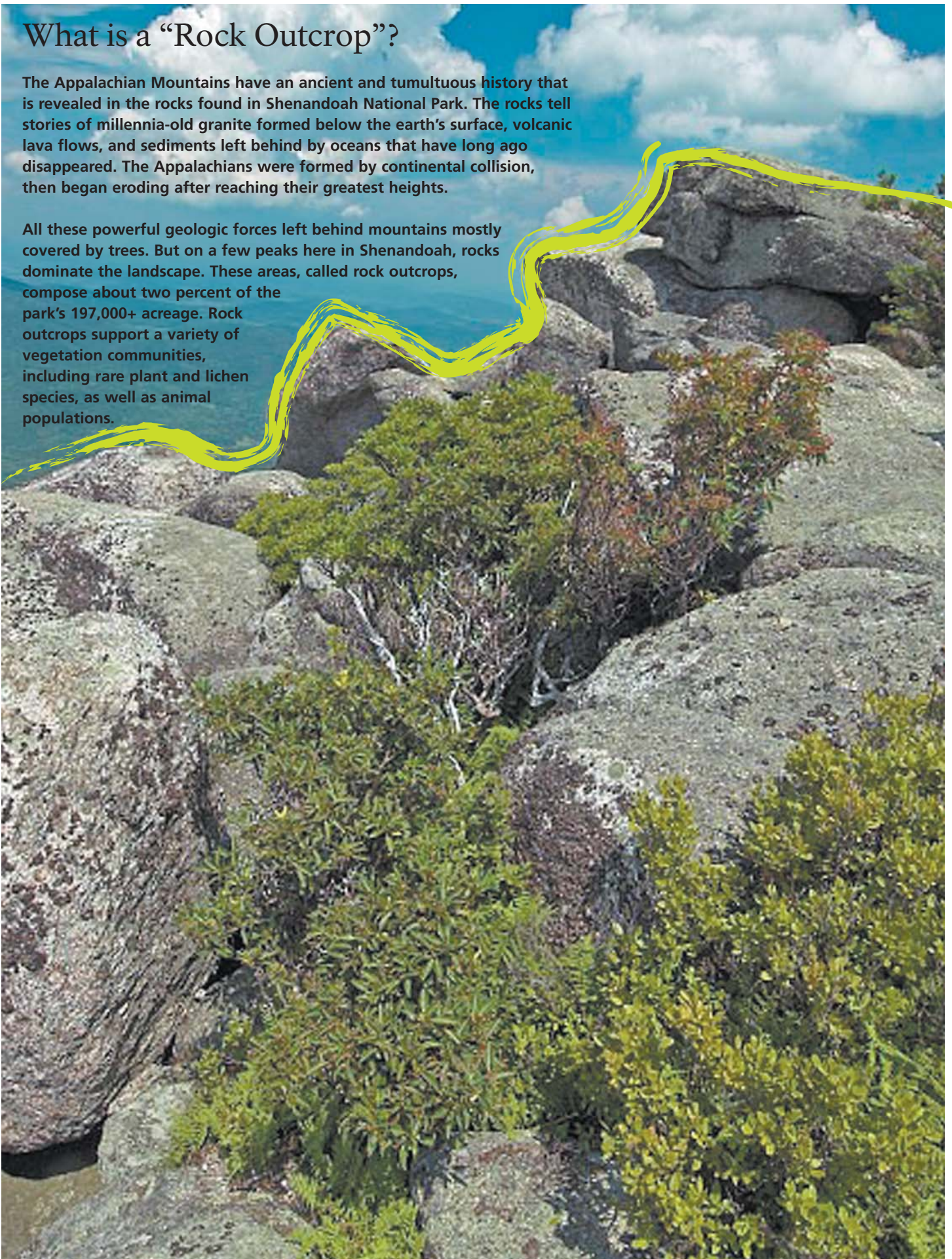


*For Ages 13+*

## What is a “Rock Outcrop”?

The Appalachian Mountains have an ancient and tumultuous history that is revealed in the rocks found in Shenandoah National Park. The rocks tell stories of millennia-old granite formed below the earth's surface, volcanic lava flows, and sediments left behind by oceans that have long ago disappeared. The Appalachians were formed by continental collision, then began eroding after reaching their greatest heights.

All these powerful geologic forces left behind mountains mostly covered by trees. But on a few peaks here in Shenandoah, rocks dominate the landscape. These areas, called rock outcrops, compose about two percent of the park's 197,000+ acreage. Rock outcrops support a variety of vegetation communities, including rare plant and lichen species, as well as animal populations.



# AT A GLANCE



## Before you go, don't miss this!

From late March through early June, visit Skyland Lodge for live streaming images from the Stony Man Falcon Webcam. The nest cannot be seen from the summit as it is **UNDER** the cliff.

1

### Activity #1 Small But Mighty.

This activity should be done on your way to Stony Man summit, at Post # 11.

- Investigate lichen.
- Record data.

2

### Activity #2 On Top of the World.

This activity is done on Stony Man summit.

- Evaluate air quality.
- Investigate lichen.

3

### Activity #3 Life "On the Rocks."

This activity is done on Stony Man summit.

- Read the text and answer questions.
- Investigate and critique the area as habitat.

4

### Activity #4 Express Yourself.

This activity is done on Stony Man summit.

- Write or draw: choose 2 of 3 activities.

5

### Activity #5 What Does it All Mean?

This activity can be done anywhere. Analyze communities and evaluate their importance.

6

### Activity #6 The Future of Shenandoah's Rock Outcrops.

This activity can be done anywhere.

- Evaluate the importance of rock outcrops as a park manager.

*Upon completion of this booklet, take it to Byrd Visitor Center or Dickey Ridge Visitor Center to review it with a Park Ranger and receive your patch and certificate.*

**Ready. Set. Hike...**



## Activity #1

### Small but Mighty.

*This activity should be done on your way to Stony Man summit, at Post #II.*

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#### Who knew?

How do lichens contribute to soil development?

Read the article about lichens that is in your folder.



**Crustose lichens** form crusts that are so tightly attached to the rock that they can't be moved without damaging the substrate.



**Fruticose lichens** are the most three-dimensional; most are branched. They can look like little shrubs growing upward, or they can hang down in long strands.



**Foliose lichens** are somewhat leaf-like, composed of lobes. They are relatively loosely attached to their substrates.

## Investigate:

Observe the lichen species you see and complete the chart.

Type	Texture	Color

## Draw your favorite lichen.

Do you think it is crustose, foliose, or fruticose?



## Lichen and Air Quality.

Lichens are like little sponges that take up everything that comes their way, including air pollution. When lichens start to disappear, they give warning of harmful conditions; they are indicators of overall environmental quality.

Why are lichens extremely sensitive to poor air quality?

(Find the answer in the article)



## Activity #2

### On Top of the World.

Congratulations, you have 'summitted' Stony Man!

#### How do you feel up here?

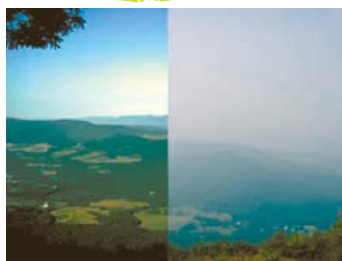
Describe this place; anything special or unique that you like?

#### Is there a view?

Describe the visibility.

Can you see across the valley to the mountains on the other side?

Do you see a brown haze over the mountains on the other side of the valley?



Sources of air pollution that affect the park are largely outside the park. These include industrial facilities throughout the mid-Atlantic region and the Ohio River Valley as well as urban centers in these same regions. Ammonia from chicken houses and pesticides that are applied to fields may contribute to air pollution in the park. In-park emission sources are limited, and very small compared to the other sources, but include motor vehicles, maintenance equipment, small boilers, and diesel generators.

What is one thing that the park can do to improve air quality?

#### Now look for lichen.

Is there less here than you saw on the hike up?

What do you think is preventing them from growing?

## Activity #3

### Life "On the Rocks."

*To be done at the Stony Man summit.*



Read the article about Peregrine Falcons that is in your folder.

**WARNING. Do not go too close to the edge! The falcon nest cannot be seen from the summit; it is on a cliff ledge tucked UNDER the cliff.**

Why did the falcon population decline between the 1940s and 1960s?



What has their recovery in Central Appalachia been like?



How many recovery goals have been met?

In Virginia, peregrine falcons are considered threatened. In Shenandoah, biologists have been attempting to reintroduce peregrines to cliffs and rock outcrop areas that have historically been their habitat. In 2006, a pair of peregrine falcons was discovered nesting on Stony Man summit, only the second pair to re-colonize in the park since the 1950s.



## Activity #3

### Life "On the Rocks."

*To be done at the Stony Man summit.*



**Assume the role of a peregrine falcon. Investigate.**

Refer to the article in your folder.

You started your life as a chick raised on this rock outcrop. Now you and your mate are looking for habitat to begin nesting for the season. What are the habitat needs for you, your mate, and your chicks?

Do you find these here?

**Amphibians—  
Up Here???**



Read the article on amphibians that is in your folder. What is an amphibian?

Why don't they find deeper water? Who else might live in deeper water?

In late July to early August water collects in small pools among the rocks. Gray tree frogs emerge from the forest to lay their eggs. You may see eggs or tadpoles if there is water. There is a threat that the pools could dry up before the tadpoles emerge.

If the pools dry up and the tadpoles die, who might eat them?

## Activity #3

### Life "On the Rocks."

*To be done at the Stony Man summit.*



#### The Shenandoah Salamander.

Refer to the "Amphibians" article in your folder.

#### Assume the role of the Shenandoah Salamander. Investigate.

What is the only federally endangered animal species found in the park?  
Where is its habitat?

What are three things that might adversely impact amphibian populations?

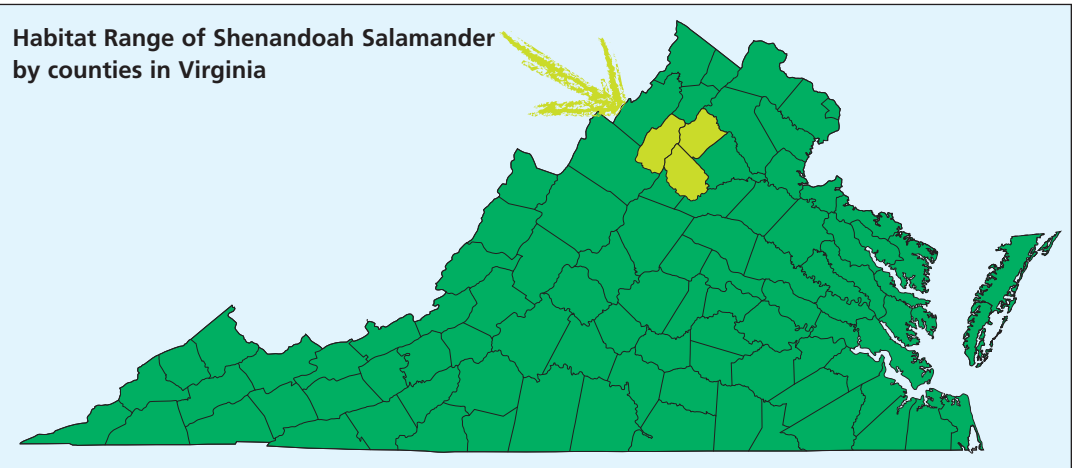
You are crawling around on the rock, looking for habitat that you need to survive.  
What are your habitat needs (food, shelter, water, space)?



Do you find these things here?

What might be affecting the Shenandoah Salamander and worldwide and park amphibian populations? (refer to article)

Habitat Range of Shenandoah Salamander  
by counties in Virginia





## Activity #4

### Express Yourself.

Do TWO of the following:

1. Sketch the outcrop from your perspective as a peregrine falcon hundreds of feet in the air, or from your perspective as a small salamander on the ground.

2. Write about this place.

Why is it special? (in story, poem, song, narrative, or any other form of expression)

3. Word Poem.

Fill in the blanks with an appropriate word, then put them together to create a poetic phrase.

example:

Salamander:

adjective:

slimy

adjective:

radiant

verb:

crawls

verb:

looks

noun:

survivor

Lichen:

Rock:

Falcon:

Stony Man:

## Activity #5

### What Does it all Mean?

*This activity can be done anywhere.*

5

You have inspected various parts of the Stony Man rock outcrop on your hike. When you put together all the elements of your observations, you get a rock outcrop community.

#### Community:

A place where all elements depend on each other to survive.



Lichen helps clean the air.



Plants provide food for animals.



Animals eat plants to survive.



Rock (greenstone) provides nutrients.

Can you rank these outcrop community members in order of importance? (rank 1-4)

\_\_\_\_\_ rock      \_\_\_\_\_ lichen      \_\_\_\_\_ plants      \_\_\_\_\_ animals

Are you having trouble ranking these? Why?

In the park, the "High Elevation Greenstone Barren" plant community is a unique combination of plant species that occurs on fewer than 10 acres world-wide. This globally rare community is of very high conservation value.



## Activity #5

### What Does it all Mean?

*This activity can be done anywhere.*



Can you take out the ones that are not necessary to the park's ecosystem?  
Write a list of community members where you live (store workers, trash collectors, teachers, police officers, fire fighters, etc.) Don't forget you and your family!


Can you take out the ones that are not necessary to your community at home?

Who do you depend on in your community?

Who depends on you?

## Activity #6

### The Future of Shenandoah's Rock Outcrops.



**Protecting  
our fragile  
resources.**

The vegetation communities and wildlife habitat that thrive on these rock outcrop areas are extremely susceptible to human activity; but plants and animals are not the only ones using the park's outcrop areas. Hikers, campers, and rock climbers also use these areas.

In fact, heavy use has led to degradation of these fragile resources through soil compaction, erosion, vegetation damage, and loss.



**Outcrop impacted.**



**Outcrop not impacted.**



## The Mission of the National Park Service:

The Organic Act of 1916 established the National Park Service:

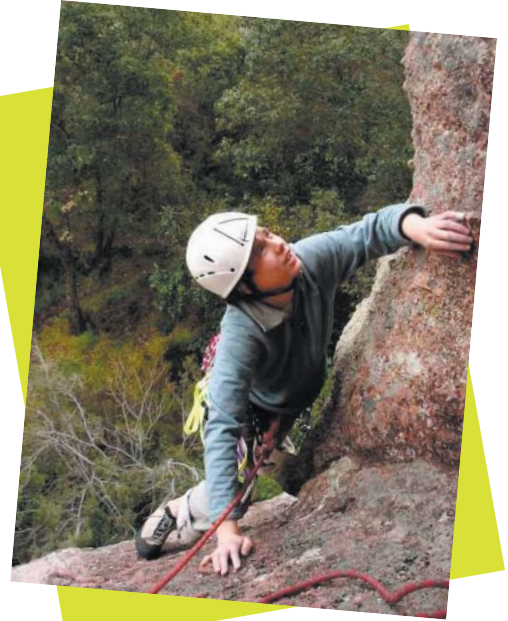
*“...to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.”*

**Put yourself in the role of park manager.**

You are mandated by law to conserve rock outcrop communities and leave them unimpaired. At the same time you are mandated to provide for the enjoyment of rock outcrops by visitors.

Which do you think is more important: rocks and plants or people enjoying activities on rock outcrops? Why?

Do you think we should close Stony Man summit to the public? Why or why not?



Why might it be important for visitors to come to the Stony Man summit?

**Brainstorm.**

Can we manage both? How?

**The park must protect cliff resources while still providing opportunities for visitor enjoyment of those resources.**



Shenandoah National Park continues to study, inventory, and survey its rock outcrop and cliff areas. Not only is the data concerning plant composition, geologic significance, and animal population important to resource managers, so is improving the understanding of how people use these areas.

The park is working on a plan to best provide for this rare habitat. The goal is to make it accessible so that all visitors to the park have the opportunity to explore and experience the natural elements that make Shenandoah National Park what it is.

As a park visitor, what can you do?

How has your experience on Stony Man changed your thinking about rock outcrops?

How has your experience on Stony Man changed how you feel about rock outcrops or the importance of Shenandoah National Park?

**Take the Challenge.**

**Back at home, visit the park's website [www.nps.gov/shen](http://www.nps.gov/shen) "Nature and Science" section to find management documents about: Cliff Management.**

Peregrine Restoration.

Visit [www.lnt.org](http://www.lnt.org) (Leave No Trace) to learn about low impact hiking and camping techniques.

Volunteer at a natural area that is rehabilitating damaged sites near your home.

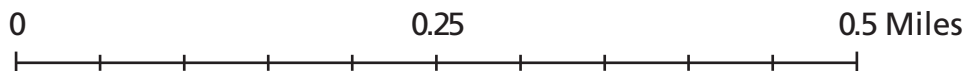
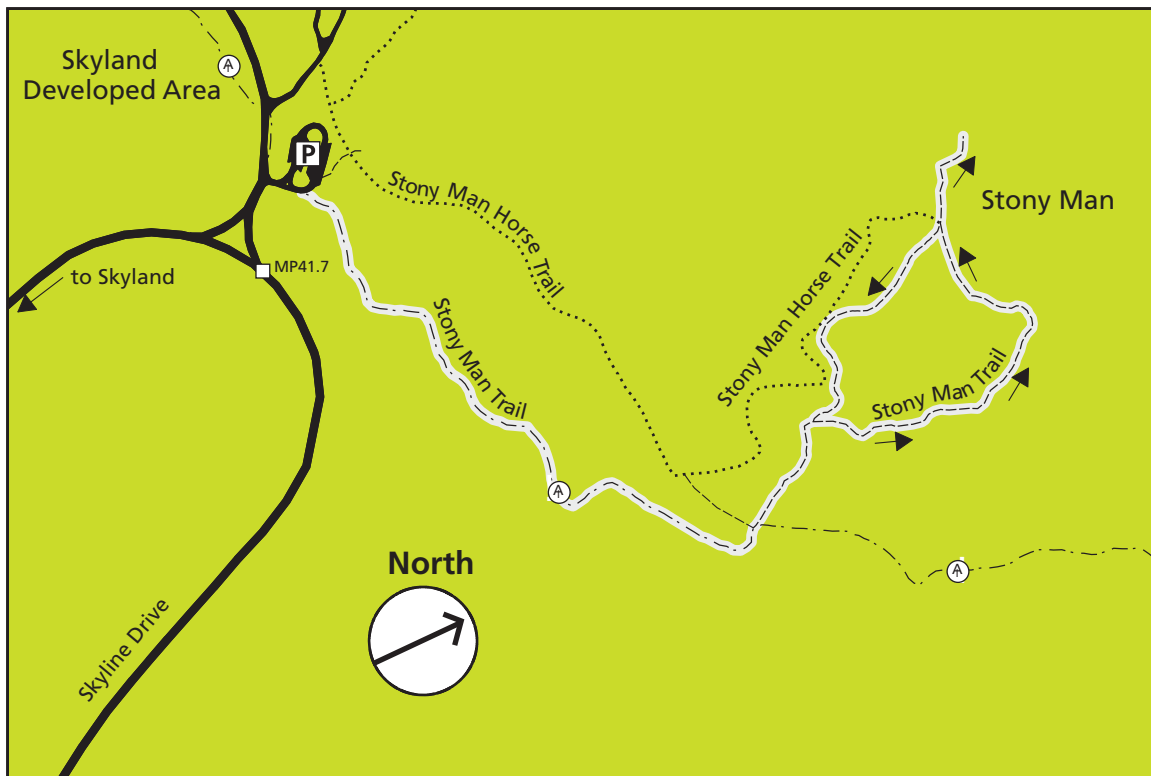
Learn more about lichens at [www.lichen.com](http://www.lichen.com) and [www.earthlife.net](http://www.earthlife.net).

Read about air pollution in national parks at [www.npca.org/turningpoint](http://www.npca.org/turningpoint).





## Mile 41.7, HIKE: Skyland, Stony Man Overlook



As you start the hike, you'll be on the Appalachian Trail with white blazes painted on the trees. When you come to a white double blaze, the AT turns right; do not do this but continue straight ahead. At the next fork, turn right. When you come to a horse hitching rail: turn right to reach the rocks and the view.

To return, retrace your steps to the hitching rail and walk straight ahead (don't take the horse trail to the right or the trail to the left). After a short walk you'll join the trail you walked up on.



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Concept and text by Donna Cuttone and Shona Terrill  
Designed by GREATgraphics!

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For questions and comments about this program write to:  
Superintendent  
Shenandoah National Park  
3655 US Hwy 211 East  
Luray VA 22835